



X-1389 US  
10/648,118

Conf. No.: PATENT  
3199

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Soon Shin Chee et al.

Assignee: Xilinx, Inc.

Title: Conductive Lid and Method of Employing  
a Conductive Lid in an Integrated Circuit

Serial No.: 10/648,118

Filing Date: 08/25/2003

Examiner: Nathan W. Ha

Art Unit: 2814

Docket No.: X-1389 US

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COMMISSIONER FOR PATENTS

P.O Box 1450

Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. §1.131

Dear Sir:

I hereby state and declare that I, Steven H.C. Hsieh, am a joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled, "Conductive Lid and Method of Employing a Conductive Lid in an Integrated Circuit," having Application Serial Number 10/648,118, and filed on August 25, 2003 (the "Patent Application").

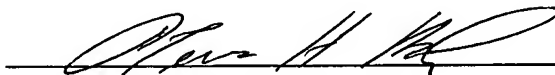
I, Steven H.C. Hsieh, further state and declare that I have reviewed and understand the contents of the Patent Application, including the claims, and that:

1. The invention claimed in the Patent Application was conceived before May 19, 2003. Attached is a true and accurate copy of (i) an Abstract of the Invention, (ii) a Detailed Disclosure of the invention, and (iii) a page of drawings, all from an invention disclosure describing the claimed invention. Each of the attached portions of the invention disclosure prepared by the inventors were signed by the inventors and witnessed by two co-workers prior to May 19, 2003. The date on the page of drawings has been redacted.

2. From before May 19, 2003, until the constructive reduction to practice of the claimed invention by filing the Patent Application on August 25, 2003, I diligently participated in preparing the Patent Application by discussing the invention disclosure as requested by the attorney preparing the Patent Application, and reviewing the Patent Application prior to filing.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed this 16<sup>th</sup> day of August, 2006, by:

Signature:   
Steven H.C. Hsieh

Witnessed this 16<sup>th</sup> day of August, 2006, by:

Signature:   
Julie A. Matthews

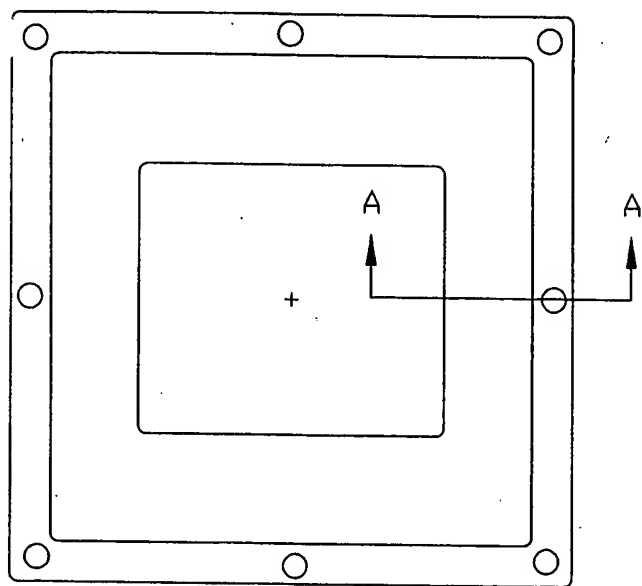
1. **Abstract of the Invention**

Metal lid also known as heat-sink often exhibit a problem of separating and coming off from the top of a package. This is due to the adhesion strength of epoxy sometimes not being strong enough to hold the metal lid to the package. The epoxy to bond the heatsink to the package is typically but not limited to being dispensed along the sides of the package. This invention describes the methodology of adding thru holes to the corners and/or sides of the lid. The holes may be made anywhere along the epoxy dispense area to improve strength. The configuration and total number of holes created can vary from each application. The holes extend from the bottom of the metal lid which is bonded to the package through to the top of the metal lid. The holes can be tapered in shape with the top bigger and the bottom smaller in diameter. Although straight holes can also be utilized, it may not be as strong as tapered hole. Another method is to make small hole from the bottom and larger hole from the top. During lid attachment, the epoxy will penetrate into the holes and become cured. The larger diameter at the top acts like the head of a screw or nail to prevent separation of the metal lid from the package. The lid would then be "anchored" in place by the epoxy. The epoxy could be thermally conductive for better heat dissipation.

**3. Detailed Description**

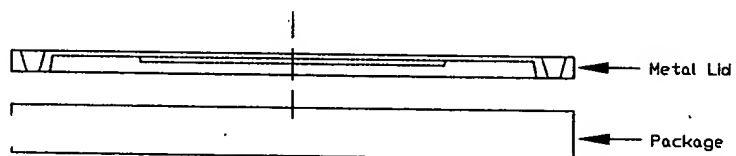
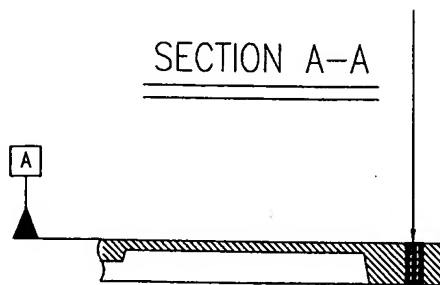
- a) See figure 1 for a drawing of a three of the possible configurations.
- b) The location, size, and shapes of the holes on the lid can be varied depending on application. Figure 1 shows three possible configurations. These are a straight through hole, a tapered hole and dual diameter hole.
- c) The novel features are use of a through hole and tapered shape of the hole.
- d) Generalize the patent application to include multiple variations of the locations, size, and shapes of the holes on the lid.

Figure 1. Package Metal Lid (Heatsink) Drill Thru Versions



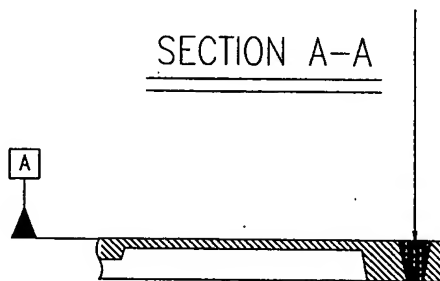
Heatsink with straight drill thru holes

SECTION A-A



Heatsink with tapered drill thru holes

SECTION A-A



Heatsink with multi-diameter drill thru holes

SECTION A-A

